



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

LIFE HISTORY OF AN UNDESCRIBED ASCOMYCETE ISOLATED FROM A GRANULAR MYCETOMA OF MAN

C. L. SHEAR

(WITH TEXT FIGURES 1-3)

In March 1921 we received from Dr. Mark F. Boyd of the Medical Department of the University of Texas, Galveston, Texas, cultures of a fungus showing perithecia and conidia for identification. This fungus was isolated from a lesion in a diseased ankle of a negro in Texas. The clinical history of this case with a general description of the organism has recently been published by Doctors Boyd and Crutchfield.¹ In brief the history of the case and of the organism is as follows:

Some twelve years ago the patient while barefooted ran a thorn into the sole of his foot. The thorn was removed and the wound apparently healed. About three months later the ankle began to



FIG. 1. *Allescheria boydii*. a, Cephalosporium stage, conidiophores and conidia $\times 277$; b, conidia, $\times 530$.

pain and became swollen. The swelling became soft and finally ruptured, discharging bloody pus. The lesions healed over temporarily, but continued to break at intervals. Soon after the pa-

¹ Boyd, Mark F., & Cutchfield, Earl D. Contribution to the Study of Mycetoma in North America. Am. Jour. of Trop. Med., 1, no. 4, 215-289, July, 1921.

tient was admitted to the hospital, which was 12 years subsequent to the thorn wound, the diseased tissues were washed out and found to contain granules. These granules when crushed and examined with a microscope and also when sectioned showed the presence of fungous hyphae. Portions of these granules when transferred to culture media produced an abundant growth of an apparently pure culture of the organism under discussion.

The history of the case and the nature of the fungus appear to indicate that this organism was probably introduced into the foot with the thorn, and that it had remained there and was perhaps the chief contributing cause of the pathological condition which developed later. Inoculation experiments conducted by Dr. Boyd with guinea pigs were not successful in producing pathological effects of the mycetoma type, the reactions observed in such cases being only such as would be expected from the introduction of a foreign body into the tissues. As the fungus does not appear to be an anaërobic organism, it is difficult to understand how it could have continued to live and develop for so long a period within the tissues of the foot and ankle before any lesion occurred.

Upon receiving the cultures of the fungus, sub-cultures in poured plates were made to isolate ascospores and conidia and to determine the life history of the organism and the genetic relations of the three forms of fructification found. This was soon done as the fungus develops readily on ordinary culture media, such as cornmeal agar or glycerine agar, and in a few weeks produces all the spore forms, beginning with conidia, which are regularly followed by perithecia. The coremia (fig. 3) are not so uniform and regular in appearance as the other spore forms and sometimes do not develop until after perithecia have appeared. In culture on cornmeal agar, colonies developed from spores are white at first, soon becoming gray and with a radiate, fimbriate margin. As conidia begin to form at the center the color becomes pale greenish-ochraceous and the surface has much the same appearance as a culture of *Cladisporium herbarum*. As the cultures become older the growth becomes darker colored and more or less smoky-brown. In a couple of weeks at ordinary laboratory temperatures an abundance of small, globose, cleistogamous perithecia are produced just

beneath or on the surface of the agar. The fungus evidently is related to the same general group of ascomycetes to which *Eurotium* belongs.

The first conidia are borne on loose-branched, spreading hyphae on lateral as well as terminal, short branches or sporophores, as shown in fig. 1 *a*. The spores are nearly hyaline, non-septate, rather variable in form and size, and are held together in groups or small masses at the apex of the sporophore by their mucous envelope. The perithecia have a thin, membranaceous wall without an ostiole. The manner in which the asci arise has not been determined. The perithecia appear to be filled at first with a granular protoplasm which becomes vacuolate as shown in fig. 2 *a*, and the young asci begin to develop toward the center. No signs

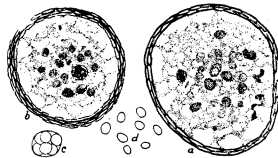


FIG. 2. *Allescheria boydii*. *a*, Median section of a perithecium showing young asci; *b*, submedian section showing a nearly mature ascus with ascospores $\times 530$; *c*, single ascus; *d*, ascospores, $\times 750$.

of hyphae have been observed in the perithecia. The asci become free and the ascus wall disappears as soon as the spores are mature. The coremium form is of the type which has been described by v. Hoehnel as *Dendrostilbella*. The synnema consist of smoky-brown, parallel hyphae which expand at the top to form the coniferous head. The fertile hyphae of the head branch in more or less dendroid sporophores, producing the conidia at the apex of the ultimate branches. These conidia are all so similar in form, size and color that they cannot easily be distinguished from the earlier conidia produced on effuse hyphae.

The fungus is evidently most closely related to the organism described by Costantin in 1896² as *Eurotiopsis gayoni*, which was found growing on meal and other organic substances at Paris. As

² Costantin, J. *Eurotiopsis*, Nouveau genre d'Ascomycetes. Bull. Soc. Bot. France, 40: 2d Ser. 15: 236-238, M. 1893.

the name *Eurotiopsis* had already been used for an entirely different fungus, Saccardo substituted the generic name *Allescheria*. The fungus described here differs from Costantin's species in producing coremia, in having larger perithecia, asci, ascospores and conidia and the latter noncatenulate. We regard it as an undescribed species and have named it *Allescheria boydii* in honor of Dr. Boyd, the discoverer.

Its characters are as follows:

***Allescheria boydii* sp. nov.**

I. Perithecia numerous, crowded, covering the surface of the medium, usually erumpent or subsuperficial, globose, thin, membranous, dark-brown astomate, 100–200 μ in diam.; asci globose or subglobose, thin walled, evanescent at maturity, 10–20 μ in diam.; paraphyses none; ascospores 8, globose to subglobose or somewhat ovoid, continuous, smooth, pale yellowish-brown when mature, globose form about 7 μ in diam., other mostly 5.5–7 \times 4–4.5 μ .

II. Pycnidia unknown or wanting.

III^a. Byssoïd conidial form, *Cephalosporium boydii*, thin, floccose, white at first, soon gray, margin radiate-fimbriate, later changing to pale greenish-ochraceous as sporulation begins, fertile hyphae much branched, spreading, conidiophores lateral or terminal mostly short; conidia adhering in small or large subglobose masses, continuous, subglobose to oblong elliptical, very variable in size and shape, hyaline at first becoming pale, yellowish-brown when old, smooth, 8–15 \times 4–7.5 μ , mostly 10–12 \times 5–6 μ .

III^b. Coremia (*Dendrostilbella boydii*) with dark brown synnema very variable in height and thickness, 200–300 μ or more high, head subglobose; sporophores alternately branching, ultimate branches once or twice the length of the conidia; conidia practically same size, shape and color as in the byssoid condition and adhering in a globular mass after abstriction.

Isolated from a lesion in a human ankle, by Dr. Mark F. Boyd, Galveston, Tex., 1921. Type: Slides no. 32921a, *Cephalosporium* form; 32921b, *Dendrostilbella* form; 32921c, *Perithecia*.

For greater convenience in referring to the various spore stages of the pleomorphic ascomycetes, we have adopted the Roman numerals used by uredinologists with some modifications to meet the different conditions. I indicates an ascogenous fructification, as a perithecium or apothecium; II indicates a pycnidial fructifica-

tion; and III a conidial stage. Where more than one conidial form occurs in the life cycle of a species, as in the present case, this may be indicated by the use of an alphabetical exponent, as III^a and III^b, and the same may be used where more than one pycnidial form occurs, thus in macro- and micro-pycnidia the former would be II^a and the latter II^b. We have used I for the ascogenous stage, because of the rather uniform, present practice in pleomorphic species of describing this stage first. It should go without saying that no idea of homology with the rusts is to be inferred from the use of similar symbols.

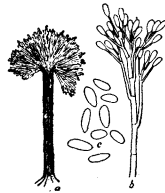


FIG. 3. *Allescheria boydii*. a, Dendrostilbella stage, $\times 277$; b, conidiophore of same with young conidia, $\times 530$; c, conidia of same, $\times 530$.

Binomial names are suggested for the conidial forms of this fungus, because in the present state of our knowledge of the genetic relationships of the various form-genera, it seems necessary to use separate binomials in referring to conidial and pycnidial forms when found separate and there is doubt as to their ascogenous stage. When our knowledge of life cycles is as complete as it is in the rusts, we should be able to discard form-genera and use only the one binomial name and the symbols to indicate the different spore forms.

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.